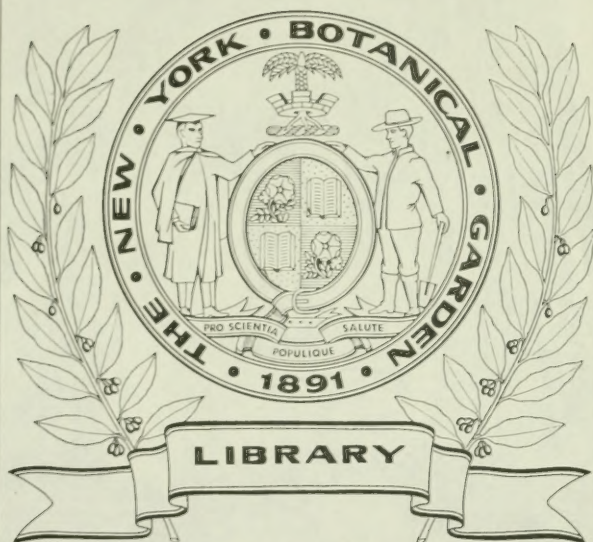




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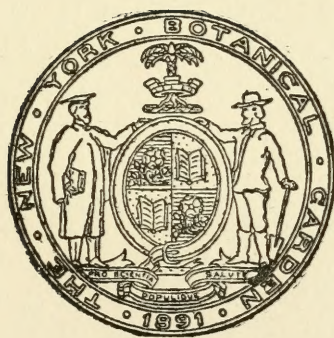


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ADDISONIA

COLORED ILLUSTRATIONS
AND
POPULAR DESCRIPTIONS
OF
PLANTS

VOLUME 7
1922



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PUBLISHED BY
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1922

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MARCH, 1922



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A bequest made to the New York Botanical Garden by its late President, Judge Addison Brown, established the

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ARIA LATIFOLIA

ARIA LATIFOLIA

Broad-leaved Beam-tree

Native of central Europe

(Plate 225)

LIBRARY
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Family MALACEAE

APPLE Family

Pyrus rotundifolia Moench, (?Verz. 29. 1785) Meth. 680. 1794.*Mespilus latifolia* Poir. in Lam. Encyc. 4 : 444. 1797.*Aria latifolia* Roem. Syn. Mon. 3 : 128. 1847.

Although of the mountain ash group of the apple family, the beam or white beam trees differ from their bright-fruited cousins in that they have simple rather than compound leaves; and their fruits are not as attractive or as numerous. To look at an old, white-barked specimen of beam gives one a composite impression of mountain ash, apple, and beech.

The white beam, *Aria Aria*, is commonly cultivated as a specimen and forest tree in Europe, and our present subject, the broad-leaved beam, is so used to a lesser extent. It is thought to be a hybrid, originally found in the forest of Fontainebleau in the 18th century.

The tree of our illustration has been grown in the Arboretum of the New York Botanical Garden, near the Japanese cherry collection, for twenty years. It has now reached a height of twenty-five feet, a substantial well-branched tree with light gray bark, flowering each spring and bearing many clusters of its brownish, spotted fruits.

The broad-leaved beam is a deciduous tree, twenty-five feet high and upwards, compactly branched from a gray, scaly trunk, with reddish-gray branches and twigs. The leaves are round to ovate in outline, three inches long on one inch woolly stalks; they are smooth above, dull or satiny, but beneath soft white or brown woolly; their margins are sharply toothed and divided into shallow lobes. The flowers are in roundish clusters having corollas of five white-clawed rounded petals, subtended by woolly five-lobed calyxes, which are persistent in fruit. The fruits are in clusters, on smooth reddish pedicels, round, brown and spotted, and about one inch in diameter.

KENNETH R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Fruiting branch.



EUCROSIA MORLEYANA

EUCROSIA MORLEYANA**Morley's Eucrosia***Native of Ecuador*

Family AMARYLLIDACEAE

AMARYLLIS Family

The botanical collector who goes into little-known countries and makes long and perilous journeys in search of plants often becomes discouraged after months of hardships and isolation from congenial spirits. At times, however, he becomes thrilled and inspired by his work. This often occurs when he is tracing the route of some great naturalist and suddenly comes upon a rare plant at the very locality, perhaps at the very spot, where it was discovered fifty or one hundred years before. The writer had such experiences in 1918 when making an extensive trip through Ecuador. For over a month he collected along the route, down the Interandean Valley, followed by Alexander von Humboldt and Aimé Bonpland in 1801 to 1803; he was at many of the localities visited by Richard Spruce which are so fascinatingly described in his "Notes of a botanist on the Amazon and Andes"; and at Guayaquil he collected some of the plants, obtained by Sinclair and Dr. Hinds, which were reported upon by George Bentham in the "Botany of the Sulphur." One of these is the plant here illustrated.

The material from which this description was drawn was collected by J. N. Rose and George Rose at Huigra, Ecuador, altitude 4,000 feet (no. 22593). A number of bulbs were sent to New York and Washington, one of which flowered in the New York Botanical Garden and was painted there in December, 1920. The plant is named for Mr. Edward Morley, of Huigra, who assisted Dr. Rose in his work there in 1918.

Bentham lists Sinclair's plant as *Callipsyche eucrosioides*. Baker in his Handbook of *Amaryllideae* under this name described it very fully. This is so different from the true *C. eucrosioides* which came from Mexico that we at once concluded that a mistake had been made. Through the kindness of Dr. Britton who was then at Kew we were able to identify our plant with Sinclair's. While in Ecuador we had the good fortune also to collect *Eucrosia bicolor*, the type of the genus *Eucrosia*, and this must be congeneric with the plant here illustrated and hence we have described our plant as a new species of *Eucrosia*.

Morley's eucrosia has a deep-seeded scaly bulb giving off one elongate peduncle 2 to 3 feet long; the leaves are oblong, spatulate, appearing long after the flowers; the flowers are about ten in a flattened umbel, nearly horizontal, yellowish green; the stamens are six, long-exserted, resting on one of the lower petals; the style is long-exserted; the capsules are three-angled with many black thin seeds.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Base of plant, with leaf, $\times \frac{1}{2}$. Fig. 2.—Inflorescence. Fig. 3.—Dissected flower, showing pistil and one stamen. Fig. 4.—Outer perianth-segment. Fig. 5.—Inner perianth-segment.



NICOTIANA FORGETIANA

NICOTIANA FORGETIANA

Forget's *Nicotiana**Native of southern Brazil*

Family SOLANACEAE

POTATO Family

Nicotiana Forgetiana Sander; Hemsl. Bot. Mag. *pl.* 8006. 1905.

This species is one of unusual interest in that it has been introduced but once from a locality not definitely known, and has been lost as a pure species, but is represented in cultivation by a mixed hybrid progeny from which, after 20 years, strains apparently typical for the species may still be obtained by selection and inbreeding.

Seeds of *Nicotiana Forgetiana* were collected about 1901 somewhere in southern Brazil by Louis Forget, a collector for Sander and Sons, the well-known English firm of nurserymen and growers of orchids. A few years later (1905) a description of the species with a colored plate was published in Curtis's Botanical Magazine from materials supplied by Messrs. Sander. The species was, however, not kept in cultivation as a pure species. It was hybridized with species having less brilliantly colored flowers, particularly *N. alata* (*N. affinis*). From the point of view of floriculture, the brilliancy of the flowers of *N. Forgetiana* was overshadowed by the diversity as well as brilliancy in the flowers of the resulting hybrids and these were introduced into the trade under the name *Nicotiana Sanderae*.

The story of the loss of the species and the character of the hybrids is given in a letter dated December 13, 1917, from Sanders to the writer as follows: "We never sold any of the original stock. We simply kept them for hybridizing purposes, afterwards selling the entire lot together with the seed. We had previously secured a batch of really fine new crosses with *N. affinis*, etc., resulting in a lovely set. When these plants were in full bloom in all the shades of rose, purple, white, pink and crimson the effect was magnificent. We did not continue with the growing of the *Nicotianas* but sold our stock. We regret very much having lost this remarkable species. We regret that we do not know the locality in South Brazil where Forget discovered his *Nicotiana*, and he is dead."

Today the seed of *N. Sanderae*, or as listed in some catalogs "*N. affinis* hybrids," will give plants with a pleasing variety of flower color including purple, dark red, light red, salmon, crimson, violet,

rose, pink, greenish-white and white. The remarkable variety of coloring seen in the early hybrids is maintained in the repeated intercrossing that occurs in the mixed plantings of hybrids grown for the production of seed.

From such a mixture, the successful selection and isolation of a strain that is true or nearly identical to the type of *N. Forgetiana* was accomplished in the breeding plots at the New York Botanical Garden. Seed labelled "*N. Forgetiana* Hyb. mixed" obtained from Vilmorin-Andrieux & Co., gave the usual mixture of types. Of these several plants with rose-red flowers were self-pollinated, the flowers being enclosed in glassine paper bags to prevent cross-pollination. One of these plants was highly self-compatible and its offspring have been remarkably uniform in general habit of growth and in flower color, closely conforming in all respects to the characters given for the plants of *Nicotiana Forgetiana*. The painting for the accompanying plate was made from one of these plants and the description of the strain is as follows:

An annual herb usually from two to three feet tall, abundantly branching from the base. The leaves are alternate, entire, and pubescent, the basal ones often one foot long, oblong-lanceolate with a winged petiole; the upper stem-leaves are smaller. The flowers are in loose somewhat compound panicles, the individual plants often blooming continuously for three months. The corolla is almost uniformly rose red, salverform, the tube about an inch and a quarter long, the limb of five nearly equal lobes and about an inch and a quarter in diameter. There are five included stamens. The fruit is a dry two-valved dehiscent pod.

The species as originally described and as represented in this strain recovered after hybridization is a highly ornamental plant, which, however, is represented in the mixed plantings of the hybrid stock by at least some of the plants with rose-red flowers.

A. B. STOUR.

EXPLANATION OF PLATE. Fig. 1.—Inflorescence. Fig. 2.—Leaf. Fig. 3.—Corolla, split open, showing stamens. Fig. 4.—Flowering calyx. Fig. 5.—Fruiting calyx.



BILLBERGIA SAUNDERSII

BILLBERGIA SAUNDERSII

Saunders' Billbergia

Native of Brazil.

Family BROMELIACEÆ

PINEAPPLE Family

Billbergia Saundersii W. Bull, Gard. Chron. II. 1 : 78. 1874.

The billbergias, including about forty tropical American epiphytes, are a group of the showiest plants of the bromeliad family, of which the most familiar example is the pineapple. They have broad stiff leaves, often spotted or variegated, bright red or pink bracts, and flowers of attractive shades of blue and green. *B. Saundersii* is one of a group of Brazilian species with racemes of drooping flowers. It was first brought to the attention of horticulturists in 1871, when plants were exhibited before the Royal Horticultural Society of England by Mr. W. Wilson Saunders, for whom the species was named. Many beautiful billbergias were grown in greenhouses at that time. The plant from which plate 228 was made was grown in the bromeliad collection at the New York Botanical Garden, in which *Billbergia Saundersii* has been represented since 1902, when plants were brought here from Europe.

Billbergias are grown in warm houses in baskets or pans of fern root or sphagnum, imitating their natural epiphytic growth. They may also be grown in ordinary soil. They are propagated by means of suckers from the old plants.

Saunders' billbergia is an epiphytic herb, with short stems covered with alternate closely set leaves forming a rosette, their bases curved and cupped. These leaves are stiff, leathery, a foot or more long with spiny margins, curled ends, green with whitish spots on the upper side and reddish on the lower side. The flowers are in loose drooping racemes up to one foot long, and are subtended by bright red or carmine leaf-like bracts which are about one inch wide and three inches long. Each flower is nearly three inches long; the calyx with a short green tube and three oblong, acute, white-scurfy lobes, the corolla with three strap-shaped green petals, two inches long, twisted together at their ends, enclosing a long slender style and stamens.

KENNETH R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Inflorescence. Fig. 2.—Upper part of leaf. Fig. 3.—Flower, with calyx and corolla removed. Fig. 4.—Odd petal, with stamen. Fig. 5.—Lateral petal, with stamen.



HAMAMELIS MOLLIS

HAMAMELIS MOLLIS**Chinese Witch-hazel***Native of China*

Family HAMAMELIDACEAE

WITCH-HAZEL Family

Hamamelis mollis Oliv. in Hook. Ic. Pl. pl. 1742. 1888.

The witch-hazels, comprising the genus *Hamamelis*, are a group of six species, with peculiar habits and distribution. Three of them occur in eastern North America, where our common species, *Hamamelis virginiana* (see our plate 142), is a well-known shrub, worthy of more frequent cultivation. Three others occur in eastern Asia, in temperate parts of China and Japan, and appear occasionally in American gardens. Of these the best known is *Hamamelis japonica* (see our plate 98), which came to the attention of western botanists nearly a century ago. All the Asiatic species bloom in late winter or very early spring. Of the American, one opens its flowers in early spring, one in mid-winter, and our common eastern witch-hazel in late autumn.

The Chinese witch-hazel was first collected in the province of Hupeh, central China, by Augustine Henry, and is now known also from the province of Kiangsi. It is comparatively seldom planted in America. Like all witch-hazels, it is typically a shrub, branching low and frequently with several stems from the one base. Occasionally it rises to the dignity of a small tree. The cultivation and propagation of all the species are practically identical, and, except for differences in the time of blooming, their horticultural value is essentially the same.

Witch-hazels are propagated from seeds or by layering, or may be grafted on other witch-hazel stock. They are slow-growing shrubs, and need to reach a considerable size before their flowers are produced in sufficient abundance to be attractive. Tending to irregularity in their form, they are best adapted to corners or forest margins, or in connection with other shrubs, to be used as a background for perennials.

Our illustration was prepared from a plant growing in the Fruticetum of the New York Botanical Garden, where it is perfectly hardy and blooms in February or early March.

The Chinese witch-hazel is a shrub or small tree, with stiff and rather irregular branches. Its leaves are alternate and with short stalks an inch long or less. The leaf-blades are three to four inches long and nearly or quite as broad, being widest above the middle, whence they taper abruptly into a short point and gradually to a broad heart-shaped base. When young they are softly velvety with star-shaped hairs on both sides. These hairs are persistent on the lower side, which remains velvety, but soon disappear from the upper side, leaving that surface slightly rough to the touch. The margin of the leaf is provided with short broad blunt teeth at the end of each principal vein. The flowers are produced from scaly buds and appear in clusters of two to eight on short stalks along the stem. The calyx is small and divided deeply into four bluntly triangular sepals which are curved outward. Alternating with the sepals are four long and narrow yellow petals, suffused with red at the base, and nearly or quite an inch long. There are four fertile stamens, and four infertile ones, which are shorter and reduced to flattened scales. In the center of the flower, and partly attached to the calyx, is the ovary. It has two cavities, with a single ovule in each, and is prolonged above into two short styles. The fruit is a dry and hard capsule, ripening in the autumn and opening with explosive violence, so that the hard, smooth, black seeds are discharged to a considerable distance.

H. A. GLEASON.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Leaf. Fig. 3.—Full-grown but immature fruits. Fig. 4.—Mature fruit.



VERBENA ERINOIDES

VERBENA ERINOIDES

Moss Verbena

Native of Peru and Chile

Family VERBENACEÆ

VERVAIN Family

Verbena erinoides Lam. Tab. Encyc. 1 : 57. 1791.*Verbena multifida* Ruiz & Pav. Fl. Per. 1 : 21. 1798.

During the middle of the last century one of the favorite flowering plants, particularly for bedding out in summer, was the verbena. At one time as many as three hundred varieties of verbenas were catalogued. They were popular show varieties, derived from several South American species, propagated by cuttings or by pegging down, and were grown as large specimen plants. After perhaps 1880, however, the decline in verbena growing was noticed in Europe and America. Mr. S. Henshaw, the first Head Gardener of the New York Botanical Garden, writing in Thomas Meehan's Monthly in 1896, bewailed the discard of the verbena. It is now a garden annual, grown each year from seed. *Verbena erinoides* has perhaps not entered into the making of the garden varieties to any great extent, but is grown as an annual for its own beauty. It is now rather rare in cultivation, but has been grown in our flower borders near range one of greenhouses, along with its congener, *Verbena venosa*, a sort with larger, shiny leaves and pink-purple blooms.

Seeds of the moss verbena should be sown in boxes or pots early in spring and transplanted to the open ground after warm settled weather.

The moss verbena is a branching herb with hairy stems from an annual root. The leaves are ovate in outline, but are finely divided into many acute lobes, and are rough-hairy above and on the veins beneath. The flowers are in short dense spikes, one to two inches long, lengthening in fruit, with pointed bracts subtending the flowers and seeds. The calyxes are five-angled and five-lobed, with one lobe shorter and smaller. The corollas are pink-purple, with long tube and spreading limb of five lobes. In the corollas the upper one or two lobes are enough different in size to make them almost two-lobed. The stamens are four, inserted within the corolla tube in two pairs, the longer pair with a brownish-purple appendage to the anther-connective. The seeds are up to one half inch long, slender, five-to six-angled and often have the persistent calyx enclosing them.

KENNETH R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Upper part of stem, with inflorescence. Fig. 2.—Corolla, split open, $\times 2$. Fig. 3.—Appendaged stamen, $\times 4$. Fig. 4.—Unappendaged stamen, $\times 4$.



STYRAX JAPONICA

STYRAX JAPONICA

Japanese Storax

Native of China and Japan

Family STYRACACEÆ

STORAX Family

Styrax japonica Sieb. & Zucc. Fl. Jap. 1 : 53. 1838.

The Japanese storax resembles in many respects its near relative in America, the snowdrop tree, *Halesia*, having many bell-shaped, nodding white flowers. In cultivation it makes a shrub or small tree about fifteen feet high. It was introduced into England in 1862, and later into this country. By 1891 plants of blooming size were recorded by Thomas Meehan. Although of small size as a tree, the smooth, dark gray bark and the white bell-like flowers make it a worth-while ornamental. In the Fruticetum of the New York Botanical Garden several specimens have thrived since 1895, and from one of these our illustration was taken.

The Japanese storax is a small spreading tree with an open head; the bark is dark gray and smooth on the trunk and reddish on the young branches. The leaves are alternately placed, on slender short stalks; they are wedge-shaped at their bases and taper-pointed at their apices; they have sharply saw-toothed margins and many veins in a fine network. The flowers are drooping in threes or fours from the upper leaf-axils. Each flower has a long slender stalk, which enlarges into a bell-shaped, shallowly five-lobed calyx, pale green in color and thick in texture, which is persistent until it partially surrounds the ripe fruit. The corolla is of fine downy-white ovate petals, united at the bases of their short claws. Ten short stamens are attached to the united base of the petals, surrounding the style which is slender and exserted. The fruit is pale green, hard, bony, and persistent.

KENNETH R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Corolla split open. Fig. 3.—Fruiting branch.



TRADESCANTIA VIRGINIANA

TRADESCANTIA VIRGINIANA

Spiderwort

Native of the eastern United States

Family COMME LINACEÆ

SPIDERWORT Family

Tradescantia virginiana L. Sp. Pl. 288. 1753.

The name *Tradescantia*, like that of several genera of plants originally designated to honor one man, really serves to commemorate the botanical activities of several. The elder John Tradescant, who lived prior to 1638, served as gardener to Charles the First of England, while his son of the same name was in the employ of Charles the Second, in the same capacity as his father.

The subject of the accompanying illustration was the species Linnaeus had in mind when he proposed the genus *Tradescantia*, in fact, it was the only species known to him as late as 1753.

It is the widespread species of the eastern United States, especially since it has become naturalized northeastward of its natural geographic range. This spiderwort, with a root-system adapted to thriving in various kinds of soils, through long ages of growing in low and wet meadows as well as on high and dry hillsides, is suitable for cultivation in a variety of soils and situations. The stems usually grow in clusters or colonies and support firmly the long graceful leaves. Although the leaves are alternate, two of the upper ones appear to be paired because of their proximity to each other. The bases of the foliage leaves are more or less sheathing; those of the paired leaves are somewhat dilated and form an involucre in which the dense cluster of flowers is seated. The flowers are erect in anthesis when the corolla remains open for a few hours. After anthesis the pedicel curves downward and in this position the capsule is formed and matured. The corolla is usually a purplish blue (exceptionally white), a color not too frequent in such of our wild plants as also thrive under the abnormal conditions to which they are often subjected in cultivation.

On account of its wide range, this spiderwort, in nature, may be found flowering among the Virginia-cowslips (*Mertensia*) and forget-me-nots (*Myosotis*) of the meadows or alongside of the columbines (*Aquilegia*) and rock-creesses (*Arabis*) of the hillsides.

The spiderwort is a perennial with thick roots and clustered stout or stoutish erect, nearly straight, usually simple stems mostly one to two feet tall. The leaves are alternate. The blades are linear or linear-lanceolate, less than six inches long, or up to a foot and a half long, acuminate, more or less curved, nearly flat or involutely folded near the base. The sheaths are about one inch long or less, sometimes slightly ciliate. The two floral bracts are lanceolate or linear-lanceolate, often nearly equal, usually much smaller than the leaves. The flowers are clustered on hairy pedicels one to two inches long. The sepals are elliptic, ovate, or ovate-lanceolate, usually about a half inch long, obtuse or acutish, boat-shaped, villous with long non-glandular hairs, about twice as long as broad, becoming membranous. The petals are purplish-blue or rarely white, three quarters of an inch long, suborbicular, or slightly narrowed above the middle. The stamens are conspicuous on account of the purple-bearded filaments and the bright yellow anthers. The glabrous capsules are about a quarter of an inch long. The seeds are oblong.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Summit of stem, with inflorescence. Fig. 2.—Flower, with petals and stamens removed. Fig. 3.—Petal. Fig. 4.—Stamen, $\times 2$.

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ADDISONIA

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NEW YORK CITY

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VIBURNUM CASSINOIDES

VIBURNUM CASSINOIDES

Withe-rod

Native of the eastern and central United States

Family CAPRIFOLIACEÆ

HONEYSUCKLE Family

Viburnum cassinoides L. Sp. Pl. ed. 2. 384. 1762.*Viburnum nudum cassinoides* T. & G. Fl. N. Am. 2: 14. 1841.

This viburnum is found in swampy situations from Newfoundland to Manitoba, and in the eastern United States extends at least as far south as North Carolina. It has a number of common names such as Appalachian Tea, Wild Raisin, False Paraguay-tea and Swamp Viburnum or Swamp Black Haw. It is not quite as attractive as some of the other species of *Viburnum* for it is usually a less profuse bloomer, probably because it is so often found in shaded situations. The fruit like that of other species of *Viburnum* is eatable, but it seems to me that it takes a good imagination to get much pleasure from eating the fruit of any viburnum.

The accompanying illustration was made from a shrub growing in the New York Botanical Garden, where it was planted in 1896.

The withe-rod is a much branched shrub from two to twelve feet high. The branches are gray, and the young shoots are scurfy. The leaves are rather short-petioled, and the blades are ovate or oblong-ovate, dull-green, thickish, obscurely pinnately veined and smooth or nearly so; they are one to three inches long with crenulate-serrulate or nearly entire margins and short-pointed apex. The numerous white flowers are borne in flat compound terminal usually five-rayed cymes; the cymes are two to two and one half inches in diameter and their peduncles are usually shorter than the cymes. The corolla is spreading, about one third of an inch in breadth; it is deeply five-lobed and is exceeded by the stamens. The drupe at first is yellowish but it quickly becomes pinkish and at maturity is bluish-black with a bloom and sweetish; it is globose to ovoid, and some three to five lines in length. Each drupe contains a single flattened stone, which is round or oval in outline.

KENNETH K. MACKENZIE.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Fruiting branch. Fig. 3.—Corolla, split open, with stamens.

SEP 26 1922



POLYSTACHYA MINUTA

POLYSTACHYA MINUTA

Polystachya

Native of Florida, the West Indies, and South America

Family ORCHIDACEÆ

ORCHID Family

Epidendrum minutum Aubl. Pl. Guian. 2: 824. 1775.*Dendrobium polystachyum* Sw. Sv. Vet.-Akad. Nya Handl. 21: 247. 1800.*Cranichis luteola* Sw. Fl. Ind. Occ. 1433. 1806.*Polystachya luteola* Hook. Exot. Fl. pl. 103. 1825.*Polystachya minuta* Britton; Small, Fl. SE. U. S. 328, 1329. 1903.

This is one of the most abundant and widely distributed orchids of tropical America, usually growing on trees in moist or wet situations, but like some other epiphytic plants it is sometimes seen on rocks or cliffs, indicating that the epiphytic habit is a mechanical rather than a biological one; its cord-like roots clasp the tree or rock rather firmly. It is a member of a very large genus, some one hundred and seventy species having been recognized by botanists, natives of tropical regions of both the Old World and the New. *P. minuta* is the only one of them which reaches the continental United States, in Florida, where it has been found as far north as Miami. It is the type species of the genus, and was first described from plants collected in French Guiana prior to 1775.

The accompanying illustration was made from a plant collected by Mrs. N. L. Britton and Miss Delia W. Marble in February 1913, at St. Peter, St. Thomas, Virgin Islands, which subsequently flowered at the New York Botanical Garden.

Polystachya minuta is not a showy orchid, its flowers, while often numerous, being small. It has rather slender stiff stems up to about two feet in length, with several striate leaf-bearing sheaths an inch or two long, and terminated by one or several racemes of greenish-yellow flowers one quarter to one third of an inch broad; the leaves are borne mostly below the middle of the stem, are oblong or linear-oblong, blunt or pointed, from two inches to about a foot long, and about an inch broad or less, and they are conduplicate when unfolding; the flower-buds are obliquely three-angled; the middle sepal is ovate, the two lateral ones oblique; the petals are narrowly spatulate and a little shorter than the sepals; the lip is glandular-hairy on the inner side, three-lobed, the middle lobe notched, the lateral lobes incurved; the anthers contain four waxy pollinia; the fruit is an oblong capsule five or six lines long.

N. L. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—Summit of stem, with upper leaves and inflorescence. Fig. 2.—Base of stem, with leaf. Fig. 3.—Flower, $\times 3$. Fig. 4.—Flower, the sepals removed, $\times 3$.



ACONOGONUM POLYSTACHYUM

ACONOGONUM POLYSTACHYUM

Kashmir-plume

Native of central Asia

Family POLYGONACEAE

BUCKWHEAT Family

Polygonum polystachyum Wall. Pl. As. Rar. 3: 61. 1832.

The genus *Aconogonum*—Greek meaning stone-knee and referring to the hard internodes of the stem—is here introduced to ADDISONIA. It is a typical Asiatic genus of the buckwheat family with a few outlying species in the mountains of Europe and northwestern North America. It is related to the well-known buckwheats, the genus *Fagopyrum*, also strictly Asiatic types, of which there are several kinds in cultivation. It differs from the buckwheats in the habit of growth, the foliage, the inflorescence, and the fruits. *Aconogonum phytolaccifolium*, which may some day be brought into ornamental planting, is the most widespread American representative, ranging from Alaska to Idaho and California.

For several generations the princes-feather, an “old-fashioned” plant and a native of India, has been a favorite of flower gardens especially in country districts. Within the present generation several other members of the polygonum-group of the buckwheat family have superseded it and have become very popular, and one, the Japanese-buckwheat (*Pleuropterus Zuccarini*), has become naturalized in eastern North America. The plants just referred to, except the princes-feather and the subject of the accompanying illustration, are persistent strong-growing herbaceous perennials suited for producing bold mass effects, screens, and borders. All are conspicuous, especially when in flower in the fall of the year. The Kashmir-plume produces a mass of deep green foliage in the summer. Later in the season each branch is terminated by a plume of white or pink flowers which show up in strong contrast against the deep green background of the foliage. It grows well in a variety of soils, but prefers low or moist places.

The Kashmir-plume is a partly woody perennial with grooved glabrous or hairy zigzag branches up to six feet tall. The leaves are alternate, often numerous and approximate on the branchlets. The blades are elliptic-lanceolate, nine inches long or less, long-acuminate at the apex, sometimes caudate-acuminate, slightly crisped on the edges, with numerous lateral veins, abruptly narrowed

at the base or subhastate, mostly short-petioled. The stipules (ocreae) are cylindric, loose around the mouth, usually approximate or overlapping and thus sheathing the branchlets. The plume-like inflorescence terminates the branches. The panicles are much branched, leafy-bracted below, inconspicuously bracted above. The flowers are white or pink, numerous, on slender pedicels which are subtended by scoop-like bractlets. The perianth is about a fifth of an inch wide, with the lobes broadly rounded, especially the three inner which are much broader than the two outer. The fruit is loosely surrounded by the persistent perianth.

JOHN K. SMALL.

EXPLANATION OF PLATE. Fig. 1.—Inflorescence. Fig. 2.—Lower leaf. Fig. 3.—Flower, $\times 4$.



M.E. Eaton

ANTHURIUM SCANDENS

ANTHURIUM SCANDENS

Climbing Tail-flower

Native of the West Indies and continental tropical America

Family ARACEÆ

ARUM Family

Dracontium scandens Aubl. Pl. Guian. 2: 836. 1775.

Pothos violacea Sw. Prodr. 32. 1788.

Anthurium violaceum Schott. Melet. 22. 1832.

Anthurium scandens Engler, in Mart. Fl. Bras. 3²: 78. 1878.

This epiphytic aroid inhabits the moist forests of Porto Rico, Hispaniola, Jamaica, Antigua, Trinidad, Margarita, and continental tropical America, and was originally described and figured by Plumier about the end of the seventeenth century.

The anthuriums are terrestrial or epiphytic perennials with creeping or arborescent stems, and often large, entire, lobed, or parted leaves, which are often showy and sometimes velvet-like. The flowers are perfect and arranged on a cylindric spadix at the base of which is a large, often leathery, bract-like spathe, sometimes brilliant red, pink, white, or green. The berries are fleshy, variable in shape and size, and either red, orange, purplish, or greenish.

Over four hundred and eighty species of *Anthurium* have been described, of which only a few are under cultivation; these in conservatories.

The plant which furnished the illustration was grown at the New York Botanical Garden; it was obtained from the botanic garden at Utrecht, Holland, by exchange in 1902.

The climbing tail-flower has slender, often unbranched stems usually a foot or more long by a quarter of an inch or less thick, with conspicuous net-like fibrous sheaths surrounding the internodes. The alternate leaves have petioles which vary from three quarters to three and one half inches long, and are less than one eighth of an inch thick and channeled on the upper side. The lanceolate, lanceolate-ovate, or oval leaf-blades are rather thin, with scattered brown or black dots on both surfaces; they are two to nearly six inches long, and from an inch to nearly three inches wide, acute or acuminate at the apex, and acute or occasionally rounded at the base; the midvein is often prominent on both sides. The axillary peduncles are slender and usually much shorter than the leaves; the oblong-lanceolate or lanceolate spathes are green and less than one inch long; the cylindric spadix is few-flowered and often longer than the spathe; the globose or subglobose fruits are white or violet.

P. WILSON.

EXPLANATION OF PLATE. Fig. 1.—Flowering stem. Fig. 2.—Fruiting spadix. Fig. 3.—Flower, top view, $\times 4$. Fig. 4.—Flower, side view, $\times 4$. Figs. 5, 6.—Perianth segments, $\times 6$. Fig. 7.—Flower, side view, with perianth removed, $\times 4$. Fig. 8.—Stamens, $\times 4$.



ALNUS RUGOSA

ALNUS RUGOSA

Smooth Alder

Native of the eastern and middle United States

Family BETULACEÆ

BIRCH Family

Betula (Alnus) rugosa Du Roi, Harbk. Baumz. 1: 112. 1771.

Alnus serrulata Willd. Sp. Pl. 4: 336. 1805.

Alnus rugosa Spreng. Syst. 3: 848. 1826.

The most common habitat of *Alnus rugosa* is along the borders of ponds and streams and in swampy places, but it also grows, less commonly, on hillsides. Its range includes most of the eastern and middle United States, from Maine to Florida, and westward to Minnesota and Texas; but its paleontologic record shows that it formerly had a considerably wider geographic distribution. Leaves, indistinguishable in their minutest details from those of the living plants, have been found in the peat and lignitic debris of Quaternary swamp deposits in Maryland, and similar, perfectly preserved impressions of both leaves and pistillate aments were found in rocks of Eocene Tertiary age in Oregon, British Columbia, and Alaska, and were described and figured under the name *Alnus serrulata fossilis* by Professor J. S. Newberry, in his "Later Extinct Floras of North America," where he remarks that the fossil specimen "closely resembles the leaves of *A. serrulata*, and I have been unable to find any characters upon which to base a distinction."

The specimen from which the accompanying illustration was made was taken from a large shrub of native growth in the New York Botanical Garden.

The smooth alder is a deciduous, monoecious shrub, usually from ten to twenty feet in height, but occasionally having the appearance of a small tree and reaching a height of thirty or forty feet. The bark, except on the young shoots, which are more or less pubescent, is smooth, brownish, and marked with lighter colored lenticels, which often give to it a somewhat speckled appearance. The leaves are obovate or oval, rounded and obtuse at the summit, wedge-shaped or occasionally rounded at the base, finely denticulate on the margin, green on both sides, but somewhat darker above than below, smooth except on the veins, which, especially on the under surface, are clothed with a fine white or rufous pubescence. The flower-buds, consisting of separately clustered staminate and pistillate aments, or catkins as they are more commonly known, are formed late in summer, remain dormant during the following

winter, and expand into maturity in the early spring, before the appearance of the leaves in northern and temperate latitudes and at the same time as the leaves farther south. The staminate aments are pendulous, linear-oblong or club-shaped, and from two to four inches long when fully matured. They are conspicuous appendages to the naked branches in winter and early spring, but they soon drop off after the pollen has been shed. The pistillate aments are erect, short, and relatively inconspicuous until they have matured and shed their seeds, after which they remain attached to the branches, many of them until the following spring, in the form of rigid, ligneous cones.

ARTHUR HOLLICK.

EXPLANATION OF PLATE. Fig. 1.—Branch with staminate and pistillate inflorescence. Fig. 2.—Branch with full-grown but unripe fruit, and old persistent catkins of the preceding year. Fig. 3.—Young staminate catkins. Fig. 4.—Scale of staminate catkin, with flowers, $\times 5$. Fig. 5.—Staminate flower, $\times 8$. Fig. 6.—Pistillate catkin, $\times 5$. Fig. 7.—Scale of pistillate catkin, with flowers, $\times 8$.



ANODA HASTATA

ANODA HASTATA**Halberd-leaved Anoda**

Native of Mexico, Central America, and the West Indies

Family MALVACEÆ

MALLOW Family

Anoda hastata Cav. Diss. 1: 38. 1785.

The genus *Anoda* contains about fifteen species of annual or occasionally perennial herbaceous plants, ranging in their distribution from the western United States through Mexico, Central America, and the West Indies to South America. They are usually weedy in habit, grow naturally in waste or barren places, and are of little value horticulturally.

Plants of *Anoda hastata* have been grown in the New York Botanical Garden since 1912, originating from seeds brought by Dr. Britton from Oriente, Cuba. At first only specimen plants were grown. In cultivation it made a robust growth, bore larger flowers than in the wild, and gave some promise of being of use in gardens. Seeds were collected and sown in 1917 and since that time it has been one of the garden annuals regularly planted in the flower beds near Conservatory Range 1, a specimen from which has furnished the subject of our illustration.

From seeds sown in a greenhouse or hotbed in early spring strong plants can be had for early summer bloom; open ground sowing is also effective, and after the first season countless plants from self-sown seeds will spring up. These can be thinned out or transplanted to a proper distance. The general garden effect of the species is a group of freely branched, weedy plants up to four feet high, bearing many purplish-blue flowers. A few plants are sufficient to cover a large space.

The halberd-leaved anoda is a tall herb with leaves of variable shape, but generally hastate in outline, with petioles an inch long. They are entire or shallowly toothed at the margin, hirsute on the surface, and often have brownish marks near the mid-rib. The purplish-blue flowers, about an inch in diameter, are solitary in the axils of the leaves, borne on slender, hairy peduncles three to four inches long. The calyx is deeply five-lobed, the lobes spreading, and covered, as is also the apex of the peduncle, with bristly yellow hairs. The corolla consists of five obovate petals attached at the base of the stamen-column. The numerous stamens are united by their filaments into a tubular column. The carpels are numerous,

each terminating in a single style with a capitate stigma, and containing a single ovule. The fruit consists of a circular group of radiating carpels, without dividing walls, and containing a single seed for each carpel.

KENNETH R. BOYNTON.

EXPLANATION OF PLATE. Fig. 1.—Upper part of stem, with buds and flowers. Fig. 2.—Fruit. Fig. 3.—Ripe carpel, $\times 2$.



QUAMASIA ESCULENTA

QUAMASIA ESCULENTA

Wild Hyacinth

Native of central United States

Family LILIACEAE

LILY Family

Scilla esculenta Ker, Bot. Mag. *pl.* 1754. 1813.*Phalangium esculentum* Nutt. (Ker, Bot. Mag. *pl.* 1574. as synonym. 1813)
Gen. 1: 219. 1818.*Quamasia esculenta* Raf. Am. Mo. Mag. 2: 265. 1818.*Camassia Fraseri* Torr. Pacif. R. R. Rep. 24: 176. 1855.*Quamasia hyacinthina* Britton; Britt. & Brown, Ill. Fl. 1: 423. 1896.*Camassia esculenta* B. L. Robinson, Rhodora 10: 31. 1908. Not *C. esculenta*
Lindl. 1832.

This genus was named from its Indian name quamash, sometimes spelled camass. At least four species have been recognized. Most of these have edible bulbs, and were used as food by the Indians, particularly of the Northwest. Over a century ago Lewis and Clark reported that camass bulbs formed an important part of the aboriginal food supply. One species of Oregon has been reported as disagreeable to taste and unfit for food.

Nuttall in his "Genera of North American Plants" (1818) states that he collected the species here illustrated on the banks of the Huron River near Lake Erie in 1810, and it was from this locality that plants were secured in 1896 for the collections of the New York Botanical Garden, which supplied the material for our illustration. Other collectors have since extended this range through the Lower Great Lakes region and into the southern states.

This very beautiful spring-flowering bulbiferous plant, popularly known as "wild hyacinth," bears clusters of pale blue flowers on long, slender, graceful stems. It is perfectly hardy and grows well under cultivation in rather heavy soil, such as found in the rich meadows of its natural habitat. The bulbs are best planted in the fall and should need no further attention. They should be planted three or four inches apart and from four to six inches deep. Used for cut flowers, this plant possesses the advantage of opening flowers successively along the stem for some time.

The bulbs of the wild hyacinth are usually about one and one half inches long and covered by a nearly black membranous coat. The flower stalk grows from one to two feet tall and often bears one or two short, narrow, thin, nearly colorless leaves. Basal

leaves, coming from the bulb, are long and narrow, but much shorter than the flower stalk. The flower cluster is a loose raceme from three to eight inches long, usually bearing many flowers. Each individual flower is borne on a short slender stem about one half inch long, which is clasped by a slender leafy bract at its base. The pale blue or nearly white perianth is divided into six equal, narrowly oblong segments, each about one half inch long and distinctly three- or five-veined. Six slender stamens are attached each to the base of a perianth-segment. The ovary is three-celled, each cavity containing numerous ovules. The fruit is an oval capsule, distinctly three-angled; each corner splits longitudinally when ripe, thus releasing numerous shining black seeds.

C. C. GLOVER.

EXPLANATION OF PLATE. Fig. 1.—Summit of scape, with inflorescence. Fig. 2.—Leaf. Fig. 3.—Gynoecium, $\times 3$.



XYLOPHYLLA EPIPHYLLANTHUS

XYLOPHYLLA EPIPHYLLANTHUS

Hardhead

Native of the West Indies

Family EUPHORBIACEÆ

SPURGE Family

Phyllanthus Epiphyllanthus L. Sp. Pl. 981. 1753.*Xylophylla falcata* Sw. Prodr. 28. 1788.*Phyllanthus falcatus* Sw. Fl. Ind. Occ. 1115. 1800.*Xylophylla Epiphyllanthus* Britton; Small, Fl. Florida Keys 76. 1913.

The genus *Xylophylla* (Greek, woody-leaf) includes ten species of shrubs and trees, the one here described and illustrated being very widely distributed through the West Indies, and one occurring in Brazil, while about nine are confined to Jamaica. They are characterized by having flat, somewhat leaf-like leathery branches, on which the small flowers are borne in clusters in marginal notches; seedling plants, however, and sometimes shoots from cut stumps, bear true leaves. On account of their peculiar flat branches, called phyllodes, they are of especial interest, and the remarkable development of species on the one island, Jamaica, has often induced comment; there the several kinds grow under varied climatal conditions, some inhabiting very dry districts, others the wet forests, some at low elevations, others in the mountains. Some have narrowly linear phyllodes, some broad; some have green flowers, some white, some red. The cause of this differentiation of the genus into species in Jamaica, while *Xylophylla Epiphyllanthus* only occurs in the other West Indian islands, is a highly interesting subject for conjecture.

Our illustration was made from a plant collected in rocky soil near Quebradillas, Porto Rico, by N. L. Britton and J. F. Cowell in 1914, which has since flowered frequently in the greenhouses of the New York Botanical Garden.

Xylophylla Epiphyllanthus is a shrub, up to about six feet in height, usually lower; its phyllodes vary much in shape, from lanceolate to rhomboid, from two to twelve inches long and from a quarter inch to nearly an inch wide, and are often curved; the small reddish flowers are monoecious with a 5-parted or 6-parted calyx, the staminate ones with stamens in a short column, the anthers opening transversely; the pistillate flowers have a three-celled ovary and three slender cleft styles; the capsular fruit is globose, about one and one half lines in diameter. In the Bahama Islands the plant is known under the name of Abraham-bush, Scipio-bush and Sword Bush.

N. L. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—Summit of branch. Fig. 2.—Pistillate involucre, $\times 4$. Fig. 3.—Pistil, $\times 6$. Fig. 4.—Staminate involucre, $\times 4$. Fig. 5.—Portion of staminate involucre, showing glands, $\times 8$. Fig. 6.—Staminate flower-cluster, with involucral scales removed, $\times 8$.

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OF
PLANTS

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A bequest made to the New York Botanical Garden by its late President, Judge Addison Brown, established the

ADDISON BROWN FUND

"the income and accumulations from which shall be applied to the founding and publication, as soon as practicable, and to the maintenance (aided by subscriptions therefor), of a high-class magazine bearing my name, devoted exclusively to the illustration by colored plates of the plants of the United States and its territorial possessions, and of other plants flowering in said Garden or its conservatories; with suitable descriptions in popular language, and any desirable notes and synonymy, and a brief statement of the known properties and uses of the plants illustrated."

The preparation and publication of the work have been referred to Dr. John Hendley Barahart, Bibliographer, and Dr. Henry Allan Gleason, Assistant Director.

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AMORPHOPHALLUS BULBIFER

AMORPHOPHALLUS BULBIFER

Bulblet-bearing *Amorphophallus**Native of Asia*

Family ARACEAE

ARUM Family

Arum bulbiferum Roxb. Fl. Ind. 510. 1832.*Amorphophallus bulbifer* Blume, Rumphia 1: 148. 1835.

The species of *Amorphophallus*, of which over seventy-five are recognized, are natives of Asia, Africa, and the eastern tropical islands. They are mostly large herbs with huge ill-smelling calla-like flowers, which appear before or at the same time as the leaves. The tubers (corms) contain an acrid poisonous juice. Those of some species, however, are used for food after the extraction of the poison by washing, or its destruction by heat. The fresh tubers are sometimes used medicinally. New plants may readily be grown by removing the offsets from the corms, but owing to the disagreeable odor when in flower, they are popular only as curiosities.

The specimen from which our illustration was prepared was secured by an exchange with the botanic garden at Edinburgh, Scotland, in 1902.

The bulblet-bearing *amorphophallus* is a terrestrial herb with a rather small subglobose corm. The cylindric petioles, which are three or four feet long, are green and pink streaked with green or black. The leaves are three-forked with the divisions again forked, and bearing solitary subglobose bulbels at the primary and secondary forks; the ultimate leaf-segments are often decurrent and sometimes confluent, lanceolate, ovate, elliptic, or somewhat obovate and often acuminate. The erect spathe is sometimes eight inches long, pale pink or yellowish, sometimes spotted or blotched with green on the outside, rose-pink within. The male flowers are more or less crowded on the spadix, and are borne just above the female.

PERCY WILSON.

EXPLANATION OF PLATE. Fig. 1.—Portion of leaf. Fig. 2.—Flowering scape. Fig. 3.—Staminate flowers, $\times 4$. Fig. 4.—Pistillate flower, $\times 4$.



LOPEZIA HIRSUTA

LOPEZIA HIRSUTA

Hairy Lopezia

Native of central and southern Mexico

Family ONAGRACEAE

EVENING-PRIMROSE Family

Lopezia hirsuta Jacq. Coll. Suppl. 5. 1796.

Numerous plants of this attractive species have recently been grown at the New York Botanical Garden for use in the annual winter floral display at Conservatory 2, where they have drawn the interest and admiration of all observers. Cultivated in six-inch pots, they were trained into tree form, with a leafless slender trunk two to three feet high, surmounted by a spherical crown one to two feet in diameter. With their bright green leaves and numerous small but conspicuous flowers, they formed an unusually attractive background for the lower primulas and bulbous plants set in front of them.

Lopezia is a small genus of some twenty shrubby or half-shrubby plants of small size, all natives of Mexico and Central America. Five others have been introduced into American horticulture, according to the Standard Cyclopedia, but are seldom seen in cultivation, although our experience shows that they are well worthy of wider recognition. Our species is easily propagated by soft-wood cuttings taken in midsummer.

Our illustration was prepared from material cultivated in the conservatories of the New York Botanical Garden.

The young stems of the hairy *lopezia* are soft and herbaceous, reddish, softly and conspicuously hairy with white hairs, and somewhat angled. The older stems are woody, round, smooth, and red-brown in color, the angles persisting as soft, thin, narrow ridges of paper-like bark. The leaves are ovate-oblong, about an inch long by half as wide, finely and remotely toothed, sharp at the apex, narrowed to an obtuse base, and borne on petioles one fourth of an inch long. They are prominently pinnately veined, deep green above, somewhat paler beneath, marked with a narrow line of purple at the very margin, and thinly and softly hairy on both sides, but especially so beneath. The flowers are borne in short racemes terminating the stem and branches, and appear for several months during the winter. The four sepals are narrowly oblong, and red-brown in color. The petals are four, of which two are normal, red in color, almost round, and set on stalks about equaling the body in length; the other two are oblong, somewhat shorter and

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much narrower, and provided with a gland near the base. Of the two stamens, one is normal, curved down or laterally, and terminated by an anther of ordinary appearance, while the other is modified into a pink or red petal-like structure, completely sterile, and nearly or quite as long as the petals. The ovary is inferior, located below the attachment of the petals and sepals, contains four compartments, and terminates in a thick style and a capitate stigma. The fruit is a capsule, splitting lengthwise at maturity and containing numerous seeds.

H. A. GLEASON.

EXPLANATION OF PLATE. Fig. 1.—Branch with flowers and leaves. Fig. 2.—Single flower from the side, $\times 2$. Fig. 3.—Single flower, from the front, $\times 2$. Fig. 4.—Flower from which the petals and sepals have been removed, $\times 4$.



BYRNESIA WEINBERGII

BYRNESIA WEINBERGII

Weinberg's Stonecrop

Native country unknown

Family CRASSULACEAE

ORPINE Family

Echeveria Weinbergii Hort.; Theodosia B. Shepherd, Descript. Cat. 37. 1912.*Cotyledon paraguayensis* N. E. Brown, Kew Bull. Misc. Inf. 1914: 208. 1914.*Byrnesia** *Weinbergii* Rose.

Among the *Crassulaceae* are many striking ornamentals, some of which have long been favorites for carpet-bedding or where formal figures or letters are desired. Many new species, some with lurid leaves forming compact rosettes, have recently been introduced from Mexico and will be desirable additions to our gardens. In 1907, while we were carrying on studies in this family, we received a very strange plant of unknown source. In its habit it closely resembled the *echeverias* of Mexico but the flowers were very different. The plant is an extremely shy bloomer, flowering only once in Washington (December 1909) and once in the New York Botanical Garden (February 1921) during the fifteen years we have had it under observation.

Our specimen came through Frank Weinberg, along with some Paraguay plants, but he afterwards told us that he knew nothing of its origin. We have written and sent specimens to many persons in America and Europe seeking information regarding it. As a result of this free distribution of specimens two new names have been applied to it without furnishing any information regarding its native land!

One of our correspondents, Alwin Berger, writes of this plant as follows:

"The fine *Crassulacea* of which you enclose a photo was sent to me as *Echeveria arizonica* a year or two ago. I have no idea of its origin. It is neither an *Echeveria* nor a *Cotyledon*; neither can it be called a *Sedum* but it comes very near this genus. I do not believe that it comes from Paraguay; it looks like a Mexican

* *Byrnesia* gen. nov.

A perennial herb, at first acaulescent but in time becoming caulescent; leaves forming a terminal rosette, fleshy, oblanceolate, pointed; inflorescence cymose; sepals 5, green, glaucous; limb of corolla spreading, the lobes 5, white, united at base; stamens 10, at first erect, afterwards spreading; carpels 5, erect, reddish.

plant. I am very fond of the plant for the fine color of the leaves and for its easy propagation."

It is easily propagated from leaf plantings.

In its technical characters this genus comes close to *Graptopetalum* but in its habit and leaves it resembles more the genus *Echeveria*, differing from it chiefly in its corolla. It is named for Edward M. Byrnes, for many years Superintendent and now Assistant in Charge, Experiment Gardens and Grounds, United States Department of Agriculture, Washington, D. C., whose landscape work there has added so much to the beauty and usefulness of this park.

Weinberg's stonecrop is at first without a stem but in time becomes five to seven inches long with a rosette of leaves at the top. These leaves are thick and broad with a flat or somewhat incurved upper face, more or less apiculate; the inflorescence is a few-branched cyme, coming from the axils of upper leaves. The corolla is rotate, the five parts being united into a short tube; the stamens are ten, spreading; the carpels are five.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Flowering plant. Fig. 2.—Single flower, cut open.



RUNYONIA LONGIFLORA

RUNYONIA LONGIFLORA

Runyon's Huaco

Northern Mexico and southeastern Texas

Family AMARYLLIDACEÆ

AMARYLLIS Family

*Runyonia** *longiflora* Rose, gen. et sp. nov.

In the John Torrey Herbarium, now kept in the New York Botanical Garden, is a plant collected in northern Mexico in 1853 by Arthur Schott while connected with the first Mexican Boundary Survey. So far as we have been able to learn this plant has not since been reported, although it is now 70 years since Schott found it. In 1921 Robert Runyon, a very keen collector, sent from Brownsville, Texas, to Washington and the New York Botanical Garden several collections of *Manfreda*-like plants, one of which flowered the same year and proved to be this long-forgotten plant of Schott's. In its roots, leaves, and habit it greatly resembles *Manfreda*, that little genus of herbaceous plants which for many years has been referred to *Agave*. It has, however, a very slender elongate flower-tube, red flowers, and sessile anthers, attached at the top of the flower-tube. We believe that it is a distinct genus which we would place between *Manfreda* and *Pseudobravia*. This very beautiful little plant is named for Mr. Runyon, who has collected many interesting plants.

Runyon's huaco is bulbous with a short thick rootstock and a cluster of fleshy roots, resembling very much the tuberose or *Polyanthes*. The basal leaves are five to seven, spreading, thick, green, mottled with purple, linear, four to eight inches long, with serrulate margins. The flowering stem is twelve to thirty inches long, slender, greenish purple, erect; the stem-leaves are few, the upper ones short and bract-like. There are five to twelve sessile, brick-red flowers; the perianth-tube is slender, one and one-half inches long; the six segments are oblong and spreading; there are six sessile anthers; the single style is included. The fruit is nearly

* *Runyonia* gen. nov.

Stem bulbous, crowning a short thick rootstock; roots thickened, fleshy, in clusters; basal leaves linear, elongate, spotted; stem-leaves 2 or 3, small, bract-like; flowering stem slender, simple, terminated by a very open spike; flowers solitary in the axils of small bracts; perianth slender, salverform, greenish white at first, brick-red in age; stamens 6; anthers sessile, inserted at the top of the tube, exserted; fruit small, nearly globular; seeds flattened, black.

globular, one and one-half inches in diameter, and capped by the withering perianth; the numerous seeds are black.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Base of plant. Fig. 2.—Upper part of flowering stem, with inflorescence. Fig. 3.—Flower, with perianth-tube split open. Fig. 4.—Fruit. Fig. 5.—Seed.



ECHINOCEREUS BAILEYI

(Plate 245)

ECHINOCEREUS BAILEYI**Bailey's Hedgehog-Cereus***Native of Oklahoma*

Family CACTACEÆ

CACTUS Family

Echinocereus Baileyi Rose, Contr. U. S. Nat. Herb. 12: 403. 1909.

The genus *Echinocereus* is one of the most interesting in the Cactus family. The species, of which we recognize 60, show a wide range in the size and color of the flowers, in the form of the stem, and in the arrangement of the spines in clusters. Some of the species are simple while others are cespitose, often forming clumps or mounds with hundreds of branches or heads.

In spite of these differences there are certain characters which they have in common, which bring the species together into a rather consistent group or genus. For instance, they are all comparatively low, one-jointed plants, with the spines arranged on ribs while the flowers come from the upper part of old spine-areoles, the ovary is spiny, and the fruit is a juicy berry, while the stigma-lobes are always green.

The plant here illustrated was described some years ago; it was discovered by James H. Gaut in 1904 and re-collected in 1906 by Vernon Bailey of the Biological Survey at Washington in the Wichita Mountains of Oklahoma far out of the known range of the genus. One of his specimens soon flowered and then died, and for years we were unable to get other specimens. In 1921 Major E. A. Goldman reported seeing this plant in the Wichita Forest Reserve and through his efforts we obtained from the forest ranger a simple plant and also one large cluster with 25 heads.

One of these heads flowered in the New York Botanical Garden May 1922. It is about four inches and one-half in diameter; it has about thirteen ribs upon which are borne closely set elliptic spine-areoles; the spines are needle-like and brown; in this specimen the flower was borne on the side of the plant a short distance above the middle but they sometimes come out near the top of the plant; the corolla is rotate, about two inches broad, with the segments narrowly oblong and acuminate.

J. N. ROSE.



TRICHOSPORUM PULCHRUM

TRICHOSPORUM PULCHRUM

Beautiful Trichosporum

Native of Java

Family GESNERIACEAE

GESNERIA Family

Trichosporum pulchrum Blume, Bijdr. 764. 1826.*Aeschynanthus pulchra* G. Don, Gen. Hist. 4: 656. 1838.

While the family Gesneriaceae is noted for the number of handsome species which it contains, few of them can vie with the beautiful trichosporum in brilliancy. It belongs to a genus of over fifty species, natives of the Malayan region and India, several of which have been introduced into cultivation. The one under discussion was introduced into English horticulture twenty years after its discovery, and has long been known as an attractive plant for warm-house cultivation.

In the New York Botanical Garden it succeeds best when cultivated in hanging baskets, suspended close to the glass in a temperature not lower than 65 degrees by night and reaching 80 degrees or more by day. It flourishes in a small quantity of soil, composed of a mixture of sand, leaf mold, and loam, and orchid peat is also a good substratum. The soil should be surrounded by a mass of sphagnum, to which the plants cling and into which they push their roots. Under these conditions the plants produce stems two feet long, or sometimes more, and flower irregularly throughout the year. Propagation is effected by soft-wood cuttings, which root easily in sand.

The beautiful trichosporum is an epiphyte. Its stems are smooth, deep green, or suffused with brown, rather wiry in texture, and trailing or drooping in habit. Its leaves are deep green, stiff, thick, fleshy in texture, with short petioles. The leaf-blades are broadly ovate in outline, about an inch long and almost as wide, acute at the apex, inconspicuously toothed at the margin, broadly rounded at the base, and smooth on both sides. The flowers are produced in small clusters at the end of the branches, and are about two and a half inches long. The calyx is cylindric, usually green below and reddish toward the tip, and terminates in five short, broadly triangular sepals. The corolla is tubular and gently curved. Just above its base and within the calyx it is greatly constricted for a short portion of its length. The remainder of the tube widens gradually and then expands into the funnel-form limb. It is scarlet externally but variegated with yellow markings within. The stamens are four, more or less approximate in two pairs of unequal

length, about as long as the corolla. The single ovary is very slender and is prolonged above into an equally slender style, terminated by an oblique stigma. It ripens into a long, slender capsule, containing two chambers, each with several slender seeds. Each seed is provided with a hair nearly an inch long at both base and apex, whence the generic name *Trichosporum*, signifying hair-seed.

H. A. GLEASON.

EXPLANATION OF PLATE. Fig. 1.—Branch, with flowers. Fig. 2.—Corolla, split open. Fig. 3.—Pistil.



GRAPTOPETALUM PACHYPHYLLUM

GRAPTOPETALUM PACHYPHYLLUM

Thick-leaved Graptopetalum

Native of Mexico

Family CRASSULACEÆ

ORPINE Family

Graptopetalum pachyphyllum Rose, sp. nov.

In North America there are some twenty-five genera belonging to the Orpine family. One of the recent additions to this family is the little genus *Graptopetalum*, based on a single species to which we now add a second one. The type species (*G. pusillum*) was discovered in 1906 in Durango, Mexico, by the late Edward Palmer. Barren plants of it resemble some of the small species of *Echeveria* but flowering plants look very different, having a rotate corolla like that of a *Sedum* but differing from that genus in having united petals.

In 1905 the writer, while making an extensive trip into the interior of Querétaro with Dr. Fernando Altimirano, then director of El Instituto Medico Nacional, discovered a second species growing on a cliff near Cadereyta. Living plants have since been grown in the New York Botanical Garden which have repeatedly flowered and from which our illustration was made in 1922.

This species differs from *G. pusillum* in its much more turgid obtuse leaves, besides having other minor differences.

The thick-leaved graptopetalum is much branched and more or less cespitose, the branches usually very short and crowned by a rosette of leaves, but sometimes elongated and three inches long. The leaves are very turgid, almost terete, glaucous, pale green, but sometimes tinged with purple, about one-half an inch long, and very easily detached from the stem. The flowering branches are usually weak, sometimes spreading or even prostrate, and bearing a few scattered spreading leaves; the inflorescences are in an open few-flowered cyme; the pedicels are very unequal, the longest sometimes nearly an inch long. The calyx is deeply 5-parted, the sepals are fleshy, green, appressed to the corolla, and somewhat unequal. The corolla is campanulate with a rotate limb, about two-thirds of an inch broad, with a distinct but short tube, its lobes channeled above, acute, cream-colored to yellowish, and spotted with red. The ten filaments are adnate to the corolla at the top of the tube; the anthers are brownish. The five carpels are erect.

J. N. ROSE.

EXPLANATION OF PLATE. Fig. 1.—Flowering branch. Fig. 2.—Two petals, with corresponding stamens, $\times 2$. Fig. 3.—Fruit, $\times 2$.



CROTALARIA RETUSA

(Plate 248)

CROTALARIA RETUSA**Large Yellow Rattlebox***Native of tropical regions*

Family FABACEÆ

PEA Family

Crotalaria retusa L. Sp. Pl. 715. 1753.

The genus *Crotalaria*, named by Linnaeus with reference to the rattling of the loose ripe seeds within the swollen pods, consists of many species, perhaps as many as two hundred and fifty, most of them inhabiting tropical and subtropical regions both of the Old World and the New, a few extending into the temperate zones. They are all herbaceous, annual or perennial plants, the leaves various, either simple, trifoliate, or palmately compound, the flowers in most species yellow and borne in racemes. The ten stamens are all united by their filaments and the anthers are of two kinds, the alternate ones larger. *Crotalaria retusa*, widely distributed in the American, African, and Asiatic tropics, grows in dry soil, often a weed, but a beautiful one when in bloom; it extends northward into southern Florida and has been collected in Bermuda.

The large yellow rattlebox is an annual plant, with fibrous roots, the rather stout stem up to three feet in height, usually branched, finely and softly hairy. The leaves are simple, oblanceolate, two and one-half inches long or less, short-stalked, the apex rounded or notched, the base narrowed or wedge-shaped, the under side more or less hairy. The showy yellow flowers are borne in racemes at the ends of the stem and branches, on short pedicels; the calyx is finely hairy, five-lobed, two-lipped; the standard is about three-quarters of an inch broad. The at length drooping pods are narrowly oblong, nearly round, from one inch to two inches long.

The painting from which our illustration was engraved is of a plant at Mayaguez, Porto Rico, and is contributed by Mrs. Frances W. Horne, talented wife of the dean of the College of Agriculture and Mechanic Arts at that city.

N. L. BRITTON.

EXPLANATION OF PLATE. Fig. 1.—Summit of flowering stem. Fig. 2.—Summit of fruiting stem.

RECENT PLATES

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ADDISON BROWN FUND

"the income and accumulations from which shall be applied to the founding and publication, as soon as practicable, and to the maintenance (aided by subscriptions therefor), of a high-class magazine bearing my name, devoted exclusively to the illustration by colored plates of the plants of the United States and its territorial possessions, and of other plants flowering in said Garden or its conservatories; with suitable descriptions in popular language, and any desirable notes and synonymy, and a brief statement of the known properties and uses of the plants illustrated."

The preparation and publication of the work have been referred to Dr. John Hendley Barnhart, Bibliographer, and Dr. Henry Allan Gleason, Assistant Director.

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LILIUM PARRYI

(Plate 249)

LILIUM PARRYI**Parry's Lily***Native of southern California*

Family LILIACEÆ

LILY Family

Lilium Parryi S. Wats.; Parry, Proc. Davenport Acad. 2 : 189. 1878.

This beautiful lily was first reported by Dr. C. C. Parry, who found it growing in boggy ground in the San Bernardino Mountains in Southern California in July, 1876.

Fine plants of this species have been grown in pot culture at the New York Botanical Garden with results which warrant a test in the open. Carl Purdy, a grower of California bulb plants, says of the leopard bog lilies, including *L. Parryi*, *L. Roeslii*, *L. parvum*, and *L. maritimum*, "These lilies grow naturally along the banks of small, living streams, on the borders of lakes and ponds, in deep alpine meadows, on the borders of or on raised hummocks in bogs. Their bulbs are not so deep as the others, and they are more dependent upon surface moisture. The soil in such places as I have mentioned is always rich in rotten leaves, and usually sandy; sometimes it is peat or pure humus. Shrubs or tall plants protect the surface from heat." He recommends for best growth "a light, sandy loam mixed with leaf-mold or peat" and for location "the margin of a pond or a brook, planted a foot or so above the water level in moist meadow-like expanses in sheltered places, or damp openings in woods are ideal locations. In small grounds, a hydrant can be so arranged as to give a constant drip; the fern corner is good, and the rhododendron-bed is perfectly adapted." Tilton in Bailey's "Standard Cyclopedia of Horticulture" speaks of *L. Parryi* as "A beautiful species, rather capricious and tender under cultivation, but usually succeeding well under the same conditions as *L. canadense* and *L. superbum*."

L. Parryi is one of the species seldom seen in the flower garden which will unquestionably well repay serious efforts to understand and meet the requirements for its successful culture. The plant here illustrated grew at the New York Botanical Garden from a bulb obtained from Carl Purdy, Ukiah, California.

The bulb of Parry's lily is a scaly rhizome, two to four inches long, rather densely covered with numerous slender scales that are

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frequently once or twice jointed, the segments readily taking root, forming new bulbs. The stem is smooth and from two to five feet tall. The leaves are sessile and linear-oblongate, ranging to six inches in length, mostly single and alternate, with usually one or two whorls in the middle portion of the stem. The flowers are from one to ten in a raceme. The perianth is funnel-shaped with the outer half of the segments strongly recurving; the color is lemon-yellow, more or less spotted with purplish brown. The anthers are purplish brown. No capsule has been seen on plants grown at the New York Botanical Garden, but it is described as narrow, oblong-acute, two inches long and half an inch wide.

A. B. SROUT.

EXPLANATION OF PLATE. Fig. 1.—Upper portion of a flowering stem. Fig. 2.—Bulb, showing jointed scales, $\times \frac{1}{2}$. Fig. 3.—Segment of scale, with bulblet at base, $\times 2$. Fig. 4.—Segment of scale, with bulblet at apex, $\times 2$.



LILIUM CANDIDUM

(Plate 250)

LILIUM CANDIDUM

Madonna Lily

Native of southeastern Europe and southwestern Asia

Family LILIACEAE

LILY Family

Lilium candidum L. Sp. Pl. 302. 1753.

Madonna lilies are the glory of the June garden and if planted in masses in the flower-border with delphiniums, in all shades of blue, and *Campanula persicifolia*, they are a never-to-be-forgotten delight. This lovely lily is undoubtedly the one mentioned in the Bible. As its many common names of Annunciation Lily, Bourbon Lily, Lent Lily, St. Joseph's Lily, indicate, it has figured in paintings and tapestries from the earliest times until the present day.

Lilium candidum blooms in June and July. In planting this lily, a fairly sunny location is best and the bulbs should be placed so that the top is only scantily covered with soil. It does not strike roots from the stem above the bulb but is sparsely and deeply rooted from the base. At the New York Botanical Garden it has done well in a rich loam in a well-drained location. A way to grow it that has proven successful is to dig a hole two feet wide and two feet deep and fill it up to within three inches of the surface, and then place the bulb on its side on sand and cover with sand. This provides good drainage. The best time to plant is in the late summer so that the bulb will have sufficient time to make its growth of new leaves. In winter it is well to cover with a light mulch.

Lilium candidum is subject to the very destructive rot common in lilies. When a plant is diseased it is best to dig up and burn the bulb, and choose another location for subsequent plantings. It is claimed that an effective way to cure diseased bulbs is to dig them up as soon as the tops have died down, after flowering, dust them well with sulphur, and place them in full sun on a shelf in the greenhouse for several weeks. Mr. E. H. Wilson says "the madonna lily is the glory and pride of many a cottager's garden in the south of England yet often on the Squire's estate nearby neither skill nor care can induce it to happily make itself at home," and again, "Bulbs grown in the south of England are said to be the best, tho' the majority of dealers still insist that the French grown bulbs are superior."

This lily is a native of the areas about the Mediterranean and Black Sea, from the Pyrenees mountains and the island of Corsica to northern Persia and the Caucasus. There are several quite rare varieties, none of which is superior to the type in general cultivation. The plant here illustrated was grown at the New York Botanical Garden from a bulb furnished by John Scheepers, Inc.

The bulb of the madonna lily is globular, wider at the base and narrow at the apex, white or greenish in color and two to four inches in diameter. It is composed of large thick scales, with a few coarse roots from the base. New or daughter bulbs produce numerous, glossy, green leaves, frequently ten inches in length, directly from the outer bulb-scales. These appear in late summer and autumn, previous to the year of blooming. The flowering stems are three to four feet high and bear a hundred or more leaves, much crowded below but scattered above and ranging from six to eight inches in length below, to mere bracts at the apex. There are from five to twenty waxy white, very sweet-scented flowers in a compact raceme. The perianth is decidedly bell-shaped, with the ends of the segments slightly recurving. The anthers are yellow, and the pistil is greenish white, descending and upward-curving. Well-formed capsules are about one and a half inches long, usually pear-shaped as shown in the accompanying illustration, although the shape and plumpness depend somewhat on the proper and compatible fertilization.

HELEN M. FOX.

EXPLANATION OF PLATE. Fig. 1.—Upper part of flowering stem, with all but one flower removed. Fig. 2.—Mother-bulb with two daughter-bulbs, one of which has a late summer leaf, $\times \frac{1}{2}$. Fig. 3.—Capsule, immature but of full size.



LILIUM TIGRINUM

(Plate 251)

LILIUM TIGRINUM

Tiger Lily

Native of China and Japan

Family LILIACEAE

LILY Family

Lilium tigrinum Gawler, Bot. Mag. pl. 1237. 1809.

Living plants of this species were included in the first consignment of plants sent (1804) from China by William Kerr to the Royal Botanic Gardens at Kew, England. The species proved to be the hardiest and most easily propagated of all lilies, as its extensive cultivation in Europe and America readily shows. The tiger lily maintains itself readily under average garden conditions and in abandoned gardens, and as escaped from cultivation it may be considered as naturalized in some localities. The vigorous growth is in large part due to the development of roots on the stem above the bulb. Daughter-bulbs readily develop, soon producing a cluster of bulbs from which numerous stems arise. New flowering plants from the bulblets may be obtained in a period of two years.

There are several varieties in cultivation differing slightly in the intensity of flower color, in the amount of pubescence on the stem, and in vegetative vigor. One variety is double-flowered. Wild plants of this species, collected in the region about Kuling, Kiangsu, China, have been obtained for the New York Botanical Garden through Dr. J. L. Buck, Dean of the College of Agriculture, University of Nanking, China. These are practically identical with the plant illustrated in the accompanying plate, except that they have thus far been of less vigorous growth.

There appear to be only two references to the pods and seeds of this species. The stocks cultivated appear to be fully incompatible in fertilization, a type of sterility very frequent among hermaphrodite plants, and particularly common in species of this genus. The pod shown in the plate is from one of the plants obtained from Kuling, China, and was obtained by using pollen of *L. Maximowiczii*. The other figures are of a plant that has grown in the New York Botanical Garden for many years.

The tiger lily is an herbaceous bulblet-bearing perennial usually growing to the height of from four to six feet. The stems are stiff, erect and unbranched, purplish brown in blotches, and with grayish

pubescence. The leaves are numerous, dark green, linear-lanceolate, sessile, and arranged in spiral phyllotaxy, with conspicuous dark-colored bulblets in the axils of nearly all of the uppermost leaves. The flowers are few to as many as twenty-five or more, depending upon the vigor of the plant. The flower is nodding and the perianth-segments are strongly recurving and bright salmon-red in color with numerous bluish-black spots. The six stamens diverge widely. The anthers are red. The capsule is obovoid in outline, broadly blunt at the apex, with a groove lengthwise in the middle of each cell. Well-developed single bulbs of flowering plants are usually from one and a half to three inches in diameter, globular in shape, white or pale yellow or sometimes tinged with purple especially near the surface of the soil, and multiplying by enclosed buds. The roots are coarsely fibrous and abundant both from base of bulb and at the nodes of the part of the stem that is in the soil.

A. B. SROUT.

EXPLANATION OF PLATE. Fig. 1.—Flower. Fig. 2.—Bulb, and lower portion of stem with roots and bulblets, $\times \frac{1}{2}$. Fig. 3.—Upper leaf, with portion of stem and bulblet. Fig. 4.—Capsule. Fig. 5.—Cross section of capsule.



LILIUM SPECIOSUM

(Plate 252)

LILIUM SPECIOSUM

Showy Lily

Native of China and Corea

Family LILIACEÆ

LILY Family

Lilium speciosum Thunb. Trans. Linn. Soc. 2: 332. 1794.

This late-flowering lily is hardy and easy to grow, and maintains itself year after year without any special attention. One sees it a nodding mass of rosy bloom glorifying many an otherwise humble farmyard. The flowers have a delicate fragrance and the glossy copious dark-green foliage blends excellently with almost any border or garden planting. The flowers bloom in August and September and are, with the tiger lily, the last of the procession of lilies. They are beautiful when planted with white phlox, *Campanula pyramidalis*, and *Salvia azurea*. Some consider it the best of all the lilies for the average garden. This lily has long been in cultivation in Japan, to which it was evidently introduced from its native home in Corea and China. It was first sent from Japan to Europe by the well-known Bavarian horticulturist and botanist von Siebold, in 1832, and quickly became a favorite.

The variety here pictured and described is "*magificum*," the most vigorous in vegetative growth; this and "*Melpomene*" are the two most deeply colored of all the varieties. The varieties "*rubrum*" and "*roseum*" are paler in color. The variety "*album*" is nearly pure white with yellow anthers and a green stripe on its perianth-segments. These are the best known of the fifteen varieties that have been described. The flower and leaf here shown grew at the New York Botanical Garden from a bulb obtained from John Scheepers, Inc.

The bulb of the showy lily is perennial and globose, and brown or purplish, especially when exposed to the light; it is from two to four inches in diameter. The mother-bulb divides freely and bulbs develop on the part of the stem in the soil or just above. The stem is from two to five feet tall and is rigid, erect, glabrous and green or purplish brown. The roots are abundant from the base of the bulb and on the stem above the bulb; this habit makes it easy to grow, and also makes it advisable to plant the bulb deep. The twenty to thirty or more ovate-lanceolate leaves are rounded at the base to a short petiole. The flowers are in a broadly deltoid raceme and are from six to twenty in number. The perianth

is strongly reflexed almost to the base; the white field is shaded from light rose to begonia rose and more deeply colored with carmine. There is a green stripe at the base of each segment forming a star in the throat of the flower, and it has many conspicuous papillae, longer at the throat. The white filaments are gracefully recurving, with garnet brown anthers, and the green pistil is also curved. The capsule is oblong, slightly ridged and with a broad flat apex; large capsules are frequently three inches long and one inch or more in diameter.

HELEN M. FOX.

EXPLANATION OF PLATE. Fig. 1.—Flower, with part of peduncle. Fig. 2.—Rest of peduncle, with leaf and portion of stem.



LILIUM WARLEYENSE

(Plate 253)

LILIUM WARLEYENSE

Miss Willmott's Lily

Native of central China

Family LILIACEÆ

LILY Family

Lilium warleyense Hort. Gard. Chron. III. 52: 15. 6 J1 1912.—Jour. Roy. Hort. Soc. 38 : cxlvi. f. 118. 8 N 1912.

Lilium (*Martagon*) *Willmottiae* E. H. Wilson, Kew Bull. 1913 : 266. 24 S 1913.

This lily was discovered in the province of Hupeh, China, by Mr. E. H. Wilson, in 1907. Plants from the garden of Miss Willmott at Great Warley, England, were exhibited before the Royal Horticultural Society in July, 1912, and were awarded a first-class certificate. This fact was reported immediately in the Gardeners' Chronicle, which contains the first published description of this lily, under the name "*Lilium warleyense* (?)." A few months later the Journal of the Royal Horticultural Society described the plant in a similar manner and gave a figure taken from the Gardeners' Magazine. Mr. Wilson, in the Kew Bulletin, published a Latin description under the name *Lilium Willmottiae*, but this came the following year. The plant here illustrated grew at the New York Botanical Garden from a bulb purchased from F. H. Horsford.

Although this is a hardy lily, wintering in New England without protection, it is not common in cultivation. It blooms about the middle of July, and a single stalk may bear as many as twenty to thirty flowers, opening a few at a time. Of the better known lilies, the one this species most closely resembles is *Lilium Henryi*, especially in the form of the flowers and in the general appearance of the flower cluster and capsules; but the stems are less tall, the leaves less broad, and the flowers more brightly colored than those of *Lilium Henryi*. Individual plants of *Lilium warleyense* have set seed to self-pollination at the New York Botanical Garden, but the seedlings have not as yet been grown.

The bulb of Miss Willmott's lily is white, broadly ovoid, one to three inches in diameter, with numerous broadly overlapping scales. The stems are smooth, slender and weak, three to five feet tall, and are inconspicuously marked with dark reddish spots. The leaves are numerous, spirally arranged, sessile; they are linear-lanceolate, acute, three to five inches long, and one eighth to one

quarter of an inch wide. The flowers are borne in a loose, elongate raceme, on smooth, slender, decurving pedicels, two to five inches long. The perianth is two to three inches in diameter, orange-red. The perianth-segments are strongly recurved, lanceolate, blunt at the tip and narrowed at the base; they bear fleshy papillae on the lower part and have chocolate-colored spots along two-thirds of their length from the base. The dark brown, oblong anthers are borne on smooth, awl-shaped filaments one and one half to two inches long, spreading at the tip. The pistil is smooth, one and one half to two inches tall. The capsule is erect, oblong-ovoid, truncate and depressed on the top. Well-formed capsules are one and one quarter inches long and three quarters of an inch in diameter.

HESTER M. RUSK.

EXPLANATION OF PLATE. Fig. 1.—Flower and pedicel, with part of stem and leaves. Fig. 2.—Bulb, $\times \frac{1}{2}$. Fig. 3.—Capsule.



LILIUM SUPERBUM

LILIUM SUPERBUM

Swamp Lily

Native of eastern North America

Family LILIACEAE

LILY Family

Lilium superbum L. Sp. Pl. 434. 1753.

This species is considered to be variable and forms intermediate between it and *L. canadense* are frequently noted. It is, however, a quite different species, to be distinguished by the three-sided angular flower-bud and the decidedly green "star" or eye inside at the base of the perianth. It is also a plant of somewhat more vigorous growth. The bulb is large and the rhizome more frequently branching. It is less widely distributed in nature, being most frequent along the eastern coast. Studies in the seed-breeding of the lilies, in progress at the New York Botanical Garden, show that *L. superbum* and *L. canadense* can intercross, which suggests that natural hybridization may give rise to the intermediate forms that have been observed.

This American species has been in cultivation in Europe for at least one hundred years. Once established it maintains itself under reasonable care rather permanently. As is the case with *L. canadense*, the rootstock and new bulbs are brittle and easily broken and injured when handled roughly in transplanting. Many plants of this species are self-incompatible, but cross-pollination between plants of mixed stocks or of seed-progenies usually results in seed. The seedlings remain entirely beneath the ground during the first season of growth. The plant here illustrated grew at the New York Botanical Garden from a bulb purchased through the firm of John Scheepers, Inc.

The swamp lily is a tall-growing plant frequently six or more feet in height, with strong glabrous stems more or less tinged with purple. The leaves are smooth and lanceolate and mostly in whorls of from three to eight, with some of the lower and the upper ones alternate. The inflorescence is usually a large panicle with three to forty long-peduncled nodding flowers; on young or small plants the flowers are sometimes solitary. The perianth is orange or orange strongly tinged with red and is purple-spotted. The outer three segments of the perianth are more linear than the inner three; all have a conspicuous green area at the base inside and all are strongly recurved. The stamens are diverging and the anthers are

dark brownish red. The pistil is curved upward and the style is more or less blotched with dark brownish red. The flower-bud is angular and decidedly three-sided without a constriction such as is seen in flower-buds of *L. canadense*. The flowering bulb is globose, often two inches in diameter and frequently giving rise to two rootstocks, each with a daughter-bulb. The capsule is cylindric-obovoid.

A. B. STOUT.

EXPLANATION OF PLATE. Fig. 1.—Flower, with pedicel and portion of main stem. Fig. 2.—Flower-bud. Fig. 3.—Petal, from within. Fig. 4.—Sepal, from within. Fig. 5.—Mother bulb, with base of stem and two rhizomes, each with a daughter-bulb, $\times \frac{1}{2}$. Fig. 6.—Capsule, $\times \frac{1}{2}$.



LILIUM CANADENSE

(Plate 255)

LILIUM CANADENSE

Canada Lily

Native of eastern North America

Family LILIACEÆ

LILY Family

Lilium canadense L. Sp. Pl. 435. 1753.

This species is the most widely distributed and the most common of the wild lilies of North America, being abundant in meadows from Northern Maine to Georgia and Alabama, and westward to Minnesota and Nebraska. Several varieties have been described, some with much redder flowers than the one here illustrated.

Once established, individual plants of this species thrive in gardens but do not quickly and readily increase in number for the reason that a rootstock rather infrequently branches. Under favorable conditions new bulblets arise from scales and also from seeds. The new flowering bulb, formed each year at the end of the rootstock, develops rapidly during summer, producing its own roots and becoming established as the autumn approaches. For best success in transplanting, the old and the new bulb with scales and connecting rootstock should be obtained intact late in the autumn. Seed is freely obtained but frequently only by cross-pollination. The seeds readily germinate but the young seedlings do not show leaves above the ground for a year.

This species is now being used in cross-breeding for the possible development of new varieties desirable for cultivation. It produces pods and seeds in crosses with such other species as *L. Grayi* and *L. superbum*.

The yellow and red varieties now obtainable lend beauty and grace to mixed border plantings in the home flower garden. Grown in the perennial border both the yellow and red varieties do very well, their colors and long-stemmed, bell-like, nodding flowers adding charm and color in mixed plantings with delphiniums, anthusas, deep blue aconitum, pale colored hollyhocks and snowy white madonna lilies.

The plant illustrated grew in the New York Botanical Garden from a bulb obtained wild in the Hackensack meadows in New Jersey.

The Canada lily stands from two to five feet tall, with slender smooth green stems. The leaves are lanceolate or oblanceolate,

sessile, two to six inches long, finely roughened on the margins and on the veins beneath, in the central portion of the stem usually in whorls of four to twelve but invariably scattering and alternate above and below. The flowers are nodding and solitary, or two or more in a simple whorl, or in vigorous plants more numerous in two or more somewhat regular whorls. The perianth is widely expanded and somewhat recurving; the ground color varies from yellow to bright red according to the variety, with purplish-brown blotchings. The flower-bud is almost terete in cross-section and decidedly constricted near the base. The capsule is about one and one-half inches long and oblong in shape. The bulbs are subglobose white or yellowish in color, composed of thick short scales, and propagating by a stout rootstock.

A. B. STOUT.

EXPLANATION OF PLATE. Fig. 1.—Summit of stem, with flower and flower-bud. Fig. 2.—Petal, from within. Fig. 3.—Sepal, from within. Fig. 4.—Mother-bulb, with base of stem, and rhizome with daughter-bulb. Fig. 5.—Capsule.





LILIUM CROCEUM

(Plate 256)

LILIUM CROCEUM

Orange Lily

Native of the Alpine regions of Europe

Family LILIACEÆ

LILY Family

Lilium croceum Chaix, in Vill. Hist. Pl. Dauph. 1: 322. 1786.

This glowing lily is often seen growing in small cottage gardens in a cluster of as many as twenty stalks, each with about fifty flowers, blooming over a period of several weeks. So luxuriant is the cluster growing in the course of a few years from one original bulb, that any one desiring a big return for little expense is advised to plant *Lilium croceum*. The bulbs should be planted at least six inches deep, as the plants are stem-rooting, and preferably in loose sandy loam so as to encourage them to indulge in a habit Elwes attributes to them. He says the bulbs grow long stolons which bear bulbs at various parts of them; from these later-growing bulbs stems arise at some distance from the parent stem, thus forming a colony. It is a good plan to divide them every few years.

This species is found in Switzerland, Southern France, Corsica, and the hills of Tuscany. The variety here described and illustrated is evidently the one originally from Corsica. The plant grew at the New York Botanical Garden from a bulb purchased of F. H. Horsford. Another variety is *L. croceum Chaixi*, which is a dwarf plant from the Maritime Alps with generally one and never more than three flowers and is earlier-flowering than the common *Lilium croceum*. The difference between these two varieties and also between *L. croceum* and *L. bulbiferum* is hard to determine on account of their having been in cultivation so long. *Lilium croceum* has crossed with as widely different a species as *Lilium elegans*.

Miss Jekyll, in her "Lilies for English gardens" says, "it is a flower for the sunny garden border, carrying its grand deep orange cups for nearly three weeks and its deep closely leafed stems thru the summer. It will do well among shrubs in half shade, indeed it is so hardy that there is scarcely any kind of garden space in which it will refuse to grow."

The orange lily blooms in June and July, and the flowers are without scent. The bulb is white with broad coarse scales and

measures two inches in height and one and three quarters inches in breadth. The stem is tall, ribbed, three to six feet high and not bulbiferous. The leaves are scattered and lanceolate. The flowers are in umbels, with erect broadly funnel-shaped perianths, narrowed at the base; the color is cadmium orange, shading darker, with small brown spots. There are a few papillae at the base of the perianth-segments. The capsules are well formed, one and a half inches long and one inch wide, acutely angled or crowned at the top and ridged. The anthers are brownish orange; the filaments are yellow; and the style is yellow with a brown stigma.

HELEN M. FOX.

EXPLANATION OF PLATE. Fig. 1.—Portion of stem, with flower and bud. Fig. 2.—Bulb, showing fibrous roots from stem above and both fibrous and contractile roots from base, $\times \frac{1}{2}$. Fig. 3.—Capsule, fully developed but still green.

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